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FIXED COSTS AND MARKET PRICE

SUMMARY

Significance of cost analysis for economic theory, 507. — Analysis of commercial costs, 508. — Bearing on price policy, 511. — Devices resorted to: brands, cooperative arrangements, 511. — Analysis of manufacturing costs, 514. — Machine rate analysis, prime cost, additional cost, 514. — Endeavor to avoid cutthroat competition, by consolidations, associations, brands, uniform accounting, 517. — Competition in foreign markets, 520. — Conclusions, 521.

DURING the last decade there has been a common apprehension among economists that the old economic man needed to be somewhat more definitely defined and that the progress of economic science would be greatly promoted by an elucidation of our assumptions in regard to motivation. No one has seemed to understand that the effectiveness of economic science was limited more by the inadequacy of its analysis of cost than by the nature of its analysis of demand. Practically all the laws of economic science have been closely related to cost of production analysis. The latter occupied the center of the stage not only for the classical economists, but for the writers of our economic texts. It is a fair prediction that for many decades the analysis of cost will continue to be the more important element in the attempt to explain business enterprise. It is the purpose of this paper to show how a classification of costs different from that commonly employed will throw light on the nature of competition and the adjustment of market prices. The *income account* supplemented by

the *machine rate* of modern cost accounting is to be the instrument of analysis employed for this purpose.

The ordinary income of a commercial business may be analyzed for the present purpose as follows:

SUGGESTED FORM FOR PROFIT AND LOSS STATEMENT

Sales

Furniture.....	.....
Less Returns and Allowances.....	.....	.....
	<hr/>	
Carpets.....	.....
Less Returns and Allowances.....	.....	.....
	<hr/>	<hr/>
<i>Total Net Sales</i>		.....
		<hr/>

Cost of Goods Sold

Furniture Inventory, first of period.....	.....
Net Purchases of Furniture.....	.....	.....
	<hr/>	
Less Inventory, end of period.....	.....	.....
	<hr/>	
Carpet Inventory, first of period.....	.....
Net Purchases of Carpets.....	.....	.....
	<hr/>	
Less Carpet Inventory, end of period..	.....	.....
	<hr/>	
Freight-In on Furniture and Carpets.....		.....
		<hr/>
<i>Total Cost of Furniture and Carpets Sold.....</i>		.....
		<hr/>
<i>Gross Profits from Operations.....</i>		.....

Other Income

Net Returns from Repair Department....	.....
Net Profit from Consignment Sales.....	.....	.....
	<hr/>	
Discounts on Purchases.....	.....
Less Discounts on Sales.....	.....	.....
	<hr/>	<hr/>
<i>Total Other Income.....</i>		.....
		<hr/>
<i>Total Income (Add Gross Profits and Other Income).....</i>		.....

Expenses

Advertising.....	.....
Rent.....	.....
Salaries.....	.....
Interest.....	.....
Fuel.....	.....
Freight-Out.....	.....
Operation of Auto Truck.....	.....
Operation of Wagon Truck.....	.....
Expired Insurance.....	.....
Sundry Expenses.....	.....	.....
	<hr/>	<hr/>
<i>Net Profits</i>.....		.....
Interest on Partners' Capital.....		.....
		<hr/>
<i>Balance Earned on Capital</i>.....		.....

There would be some difference of opinion among accountants as to whether the statement is satisfactory for all purposes. It will, however, serve for the purposes of this paper and is, in form, practically the same as those found in some of the modern accounting texts. Let us now raise some questions about the relation of the several items of cost to the sale price of the product.

The *cost of goods sold* is a cost which varies directly with the volume of sales. In the case of staple goods there would ordinarily be nothing to gain in the sale at a price which would not cover this class of costs. In the case of style goods, which can not be carried over safely from season to season, it might pay to sell below cost to avoid a loss of the purchase price. If staple goods were threatened with a violent decline in prices there might be sales below this cost if the prospects indicated that the sale price for the retailer would go below the cost price. There would be a sale at a loss to avoid a further loss. Retail prices, however, do not ordinarily fluctuate rapidly, and it is not common for a dealer in staple wares to sell his commodity below cost. The large department store may cut the price of a staple commodity below

the *cost of goods sold* as an advertising device. The purpose, however, in so doing is to sell style and specialty goods, which would not otherwise be sold, at a price which will result in a larger gross profit than would be secured without the price cutting. It will be the aim of the merchant to insure at all times that the per cent of gross profits on total sales will be high enough to yield the maximum of gross profits considering the expenses to be incurred.

Now let us examine the nature of the outlays included under the caption of *expense*. Rent, interest, insurance, and a part of the salary outlay will be incurred with a comparatively small volume of sales to the same extent as with a larger volume. Assume a given space for the store and a given investment for equipment, these expenses will be approximately the same in seasons of dull business as in seasons of active business. Let us for convenience call such expenses *fixed expenses*. Let us then call those expenses incurred in getting additional business, *additional expenses*. In commercial business the *fixed expenses* are small when compared with the total of *cost of goods sold* plus *additional expense*. Yet they would in many cases constitute 50 to 75 per cent of *expenses*. The bearing of these *fixed expenses* on competitive bidding, large even in commercial business, is far more important in manufacturing enterprise.

Let us suppose that the merchants in a given line of trade are selling an amount of goods which yields a net profit amounting to a fair return on the investment involved, a return at least equal to that which they suppose might be obtained in any other business that might be followed. Each has a volume of business fairly proportionate to the amount of equipment involved. There will be no temptation to cut prices when times are good

and all are handling as much trade as their facilities will justify. Now let us suppose that the advent of a new competitor into the field, or some other cause results in a decrease in the sales of each of the old merchants. Each will desire to increase his volume of business. If a new customer can be had at prices above the *cost of goods sold* plus *additional expense* it will pay to reduce prices to that point even though the *fixed expenses* are not covered. The *fixed expenses* are incurred anyway and are not increased by the additional sale. They are reduced per unit of merchandise by the sales of the character indicated, even though selling all goods at such a price would ultimately result in receivership or bankruptcy. When price cutting results in an increase in the volume of sales, a merchant whose sales are low can afford the reduction in price so long as the reduced price slightly more than covers the cost of goods sold and the additional expenses of the sale. The *fixed expenses* are not included in the necessary price of the additional sale because they are incurred even if the sale is not made.

The reader will reply that this would be an unwise price policy. The merchants themselves also urge that this is an unwise price policy. Yet one is forced to conclude that without coöperation this remission to the consumer of the major part of *fixed expenses* cannot be avoided. Since an individualistic attitude forces the kind of competition which may be called cutthroat competition, devices must be found to avoid this free competition. The chief device resorted to for this purpose is the handling of different brands. If one clothier handles the *John Brown* clothes, and his competitor handles the *Rogers Peet* brand, there then can be no close comparison of prices. Sales will be made on a style and quality basis, and the temptation to price

cutting will be largely removed. Trade agitation against price cutting is carried on to protect the staples, but regardless of all this agitation the margin of profit for such commodities is comparatively small and every merchant is trying to increase the number of his specialties.

Even in the case of staple commodities it is possible for the various sellers to effect a coöperative arrangement if the number of competitors is small. The retail lumber dealers in small cities ordinarily have some understanding in regard to a coöperative basis of prices. But the difficulty of establishing a coöperative basis for prices increases with an increase in the number of competitors. If in a field of enterprise in a given competitive area the amount of original investment per establishment is large, there ordinarily will be but few competitors. In such lines of business, a coöperative understanding is most probable. In such concerns, the fixed expenses also will be large, and the need of a coöperative arrangement the more urgent. In those mercantile lines where fixed expenses are large and the commodities are staple the dealers are more readily induced to embark upon a policy of destructive competition. The remedy for the evil is coöperation. Merchants and manufacturers, especially those whose fixed expenses are large, prefer specialties because their sale involves less temptation to undersell. The consumer of specialties has no decisive basis for comparing the prices of various dealers. In the case of such articles underselling is not an effective instrument in increasing the volume of sales. Another means frequently employed to avoid the underselling which large fixed expenses would foster is found in the use of the exclusive agent. This selling arrangement is a complementary organization designed to make special brands more

effective in accomplishing this purpose of preventing destructive underselling. Even a branded good, if in the hands of many retailers in the same community, would be subject to underselling for the same reasons as those referred to in the case of the staple commodity. If the branded good is comparatively expensive and consequently does not fall into the large class of inexpensive convenience goods, the case of exclusive agents may serve effectively to prevent selling below cost. Oak filing cabinets, typewriters, and refrigerators are well known examples of this class of goods.

Cutthroat competition has, however, been of small consequence in mercantile lines in comparison with its far-reaching effects in the manufacturing field. Here the fixed costs are large and as a result, the underselling has been severe. To aid in the exposition of the situation in manufactures, it will be worth while to present an example of the somewhat more elaborate statement of costs used by manufacturing concerns.

The form on the following page will serve to indicate the character of the statement which generally has been found satisfactory in manufacturing concerns not employing the machine rate computation.

The statement above makes entirely satisfactory provision for all the items entering into *prime cost*. The ascertainment of *prime costs* in manufactures is comparatively simple. The bearing of it on sale price is similar to that of *cost of goods sold* in the case of the commercial statement. Raw materials are not generally style goods, so that they can readily be carried forward from season to season. *Prime costs* are not ordinarily, however, so large a percentage of total costs as *cost of goods sold* would be of total costs.

The large amount of expense or *manufacturing expense* in a factory business makes it urgent that a device

FORM FOR ANNUAL MANUFACTURING STATEMENT

*Prime Cost**Inventories, April 1, 1914*

Raw Materials at cost.....	.....
Goods in Process.....	.....
<i>Purchase of Materials</i>.....	.....
<i>Direct Labor for Period</i>.....	.....

Inventories, March 31, 1915

Raw Materials at Cost.....
Goods in Process.....

<i>Total Prime Cost</i>
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Manufacturing Expense

Indirect Labor.....
Heat, Light, and Power.....
Depreciation:	
Buildings.....
Machinery.....
Patents, etc.

Supplies and Expense, Inventory, April 1, 1914.....
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Less Supplies and Expense, Inven- tory, March 31, 1915.....
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<i>Total Manufacturing Expense</i>
------------------------------------	-------

<i>Total Cost of Mfg. of chairs..</i>
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be found for its proper distribution in the computation of the cost of each article produced in a given factory. This manufacturing expense is variously called overhead, burden, indirect expense, shop charges, or manufacturing expense. For brevity it will be called overhead in the remainder of this paper.

The machine rate is a device commonly employed by large concerns in the distribution of this overhead.¹

¹ The elements of the *machine rate* used by A. Hamilton Church, one of the first men to set forth the importance of the device, are indicated in the table on page 515:

Professor Cole has given a machine rate analysis particularly useful for the purposes of this paper.¹ He has divided overhead or manufacturing expense into the following categories: (1) space costs, (2) machine costs, (3) machine-use costs, and (4) power costs. Space costs and machine costs are incurred as a result of operation. Power costs are also incurred to some extent as a result of operation. In order to cover these types of cost, Professor Cole suggests a *minimum rate* and an *additional rate*. The additional rate covers the cost per hour of running in excess of the cost that would be incurred if the machinery were idle. When the machinery is idle the cost per hour is covered by the minimum rate. When it is in operation the cost per hour includes both the minimum and the additional rate.

The analysis above indicates the importance of *minimum rate costs* or *fixed costs* in manufactures as distinct from *additional rate costs* or *additional costs* and the instrument employed for their determination and distribution. It also serves sufficiently to indicate the character of the concepts involved, so that their appli-

SHOP-CHARGE ACCOUNT — JANUARY

Debit:		Credit:	
Interest on machines.....	\$53.00	Machine earnings.....	\$576.00
Depreciation on machines.....	53.00	Being total of amount distrib-	
Power.....	100.00	uted to jobs by means of new	
Wages on automatic machines....	75.00	machine rates this month.	
Process Sundries (oil, etc.).....	45.00	Undistributed balance.....	100.00
Debit for floor burden.....	250.00		
Supervision (general).....	100.00		
Total debit.....	\$676.00	Total credit.....	\$676.00

Total hours of work during month, 4,400.

Supplementary rate equals \$100.00/4,400, or 2.27 cents per hour.

The items on the debit side above are the ones to be distributed. The items on the credit side and the notes below the table indicate the method of distribution. On the supposition that a machine or a given productive center will run a certain number of hours per year, one can fix an hour rate for the machine or machines that will cover a group of fixed expenses for the period such as those found on the debit side above. If the machine is not constantly employed, some of the expense concerned will not be distributed. Church's method is to add the undistributed expense by means of a supplementary rate at the end of the period.

¹ W. M. Cole, Accounts, ch. 19.

cation to competitive cost analysis may readily be discerned. The fixed costs are by far the larger part of overhead costs in manufactures. They might in some cases amount to approximately 50 per cent of the total manufacturing cost.

In times of active business it would be easy for a manufacturer to charge a price which would cover prime costs, fixed costs, and additional costs. If the demand were such that it not only kept all machinery active but also exceeded the total output of the machinery in full operation, the price of the factory output might go considerably above a figure that would yield a fair return on the investment. But in dull times the demand might fall off to such a point that the full time operation of machinery would not be required to supply the current demand at a price covering total costs. The question arises as to the principles governing price cutting under such circumstances.

To present complete costs for the purpose of computation, the factory cost statement must be supplemented by a commercial statement showing merchandising costs, such as that given in the first part of this paper. Complete costs, so stated, would then be the *prime costs*, the *fixed factory costs* plus *fixed merchandising costs*, and the *additional factory costs* plus *additional merchandising costs*. For convenience, *fixed costs* will be used to indicate both kinds of fixed costs and *additional costs* both kinds of additional costs.

When the lack of business means idle machinery for a factory, it pays to produce for any price above prime costs plus additional costs. Fixed costs involve loss during idle periods and any income in excess of the prime plus additional costs tends to reduce by that much the loss that would otherwise accrue. As a consequence the same principle applies to factory prices in

dull times which applies to railroad rates of parallel lines in times of depression. The financiers discovered many years ago that it was a hazardous venture to undertake to finance a railroad building a line in direct competition with an existing line. The result of such competition would ordinarily be a receivership for both. It was the fixed cost item in railroading which caused competition to be disastrous and brought about such co-operative rates that they virtually are under the supervision of the Interstate Commerce Commission.

It is not so commonly recognized that precisely the same cost factor forced the consolidation of competing steel plants into the United States Steel Corporation and at the same time forced consolidations in many other lines of industry. Consolidations have frequently had as their avowed object the reduction in costs which is supposed to result from large scale production. There is doubtless some truth in this, but students of the consolidations since 1890 ordinarily conclude that the character of the price competition which prevailed also had much to do with the consolidations. No one, however, has clearly set forth the bearing of the various cost factors on the character of the competition which invariably accompanies a depression in business.

Even after extensive consolidations had been effected in various industries there was difficulty in preventing a recurrence in these industries of the cutthroat competition of which the consolidations were a result. The devices employed to avoid its recurrence have been somewhat similar to those already referred to as existing in the retail trade. In fact, it was the factory owners who discovered how to save the retailer and save themselves at the same time.

In the first place, associations have been formed in various fields of manufactures. Through these associa-

tions there was created a certain *esprit de corps*, which developed a feeling in favor of fair competition. If the commodity concerned was of staple character, there would be a tendency to follow the price schedule adopted by the controlling factor in the trade. If a large company sold steel rails at \$28 per ton there would be a general acceptance of this price on the part of the small number of competitors still in the field. The ease with which such a coöperative practice can be established is roughly in inverse proportion to the number of competitors.

Where the staple character of the commodity can be modified by the production of different brands, the coöperative relation is much more secure. It is very difficult to prevent cutthroat competition among the producers of ordinary salt because it is not possible, here, to use a variety of brands to good effect. Similarly, it takes a strong consolidation in the sugar industry to prevent the occurrence of cutthroat competition. Altho the use of a variety of brands is not practicable in the steel industry the larger initial investment required for successful operation and the smaller number of competitors render it less difficult to prevent underselling.

The style tendencies in shoes and dress goods are to some extent an outgrowth of the requirement of specialties to prevent cutthroat competition. As soon as a given style of dress goods is standardized its production is placed on a very close profit margin. The tendency of the factories is to discover dress goods that will give them a specialty and remove them from the baneful results of cutthroat competition. A similar situation in the shoe industry results in a constantly shifting variety of styles. The competition must be placed on a style and quality basis regardless of the cost of develop-

ing a market for a new style. The new style is essential for the purpose of avoiding destructive competition.

The typewriter industry has developed another device for reaching a coöperative basis. The number of competitors was not so large that it was impossible to create a satisfactory situation in the market for new machines. But the number of dealers in second-hand machines was large and the character of the competition was dangerous. It was possible, however, by means of the number series to tell the age of a second-hand machine. The discounts on old machines can be based on their age, and the publication of the list of discounts graded in this manner serves to establish a basis of competition which does not demoralize the market.

The automobile industry furnishes an example of still another means of avoiding destructive competition. Not only must a new machine be a new brand or model, but it has a still better chance if it is made to sell at a price which will fill a rather large gap in the price range of existing machines. When the Dodge Brothers wished to compete with Ford, they did not make a car that would sell for the same price as the Ford car. They made a car of a different model and a different price.

The associations of job printers have been particularly active in promoting a uniform cost accounting plan. They have also established a rule that no one shall bid for a job at a price which will not fully cover overhead as well as prime costs. The job printers are in dire need of a coöperative basis because of the comparatively large investment in machinery and the resulting large fixed costs. If the job printers in a given locality are few it should be possible for them to get together on some such arrangement as the cost basis of bidding.

By the devices above mentioned and others of a similar character the domestic market may be so organized

as to remove the more dangerous causes of destructive competition. But this does not suffice for the foreign markets. To avoid idle machinery in dull times the factories of the various nations resort to "dumping." If protected, by a domestic tariff or otherwise, against reimports, they can afford to sell in the foreign markets at a price which will cover little more than the prime cost plus additional costs. The fixed costs, which include the major part of the overhead, need not be fully covered. This cutting of prices in a foreign market is less hazardous than it would be in the domestic market, because it is thereby made possible to sell the additional output at a lower price without demoralizing the home market. It may be pointed out, however, that this tends to demoralize the foreign market. Where the competitors for foreign trade are located in the same country they have frequently succeeded in bringing this foreign trade to the same coöperative basis as that reached for domestic trade. There is still no possibility, however, of preventing the factories of a given nation from resorting, in coöperative agreement among themselves, to cutthroat competition in foreign markets with the factories of another nation. This is substantially what has been occurring in connection with the exploitation of the foreign trade markets. A given country can largely safeguard its own factories by a protective tariff. But if there is competition between two of the leading commercial nations for the trade of some third country, there is no way of preventing cutthroat competition except by international conventions and agreements or by agreements between the respective groups of industrials in the several countries.

It should be pointed out further that the reduction of prices to a point at which they are inadequate to cover the major part of fixed costs is least damaging to

the concern for which foreign trade is a side line. Such a concern can substantially reduce its losses from idle overhead, while keeping the greater part of its trade free from danger of demoralization through cutthroat competition.

Fixed costs also have a close relation to the question of side lines in domestic trade. The side line is one of the standard methods adopted for the employment of machinery which would otherwise be idle. In this way a factory demoralizes the market for some other commodity than the one to which its productive equipment is chiefly devoted. The manager of a factory producing foundry machinery a few years ago added to its list of products a side line in hand cars or pushcarts, which it produced in dull times at low prices for the purpose of reducing the loss in overhead from idle time. The overhead has a distinct bearing on the market risk in commodities subject to side-line production, and this makes the competition in such commodities more dangerous than in other types of commodities.

Many economists have discussed the significance of "joint costs" and have attempted to define them. The cost of a by-product commodity, so long as it is a side line and the articles to whose production the factory is chiefly devoted are produced largely by factories not employing the side line, is the additional cost involved in its production over what would have been incurred without producing the side line. Other refinements on this point could be brought into the discussion, but a detailed excursion into the theory of joint costs would be going too far afield.

There is another type of by-product or side line, which should be associated not so much with idle machinery or fixed machine costs as with other fixed overhead. This can best be described by a reference to the situation

found in the marketing of farm machinery. In order to market binders and mowers over the country as a whole, the producers of these articles found it necessary to build up a large selling organization. When this selling organization was once created, it was possible to add other lines which could be sold through the same channels with comparatively small additional overhead. The result was that the company added one side line after another until it had a line which would tax its plant to capacity. It was selling all that it could sell through the given organization without an unreasonable enlargement of overhead expense. The government report showed that the company was making a smaller profit on the side lines.¹ It could afford to produce the side lines without charging a large portion of the overhead against them because their production and marketing did not involve a large addition to overhead.

What has been said above will suffice to show how general are the influences of the category of fixed costs on competitive price. In the initial stages of any enterprise the cost computation would include fixed costs as a part of the costs to be covered by market price. The cost computation made at such a time would correspond rather closely to the normal cost category in some of the current economic analyses. But when an enterprise has been launched this normal cost can no longer be the determining factor in the retention or elimination of the launched enterprise. It is this factor which makes the entry of a new plant into a competitive field particularly hazardous. If at any time the various competing plants have a demand which is insufficient to take the supply of the existing plants at their full capacity a new cost computation arises which tends to reduce market price to a figure that will cover less of the fixed costs.

¹ See Report of the Bureau of Corporations on International Harvester Co., p 243.

The demand for the output of factories is subject to great fluctuations. The rate of saving along with a considerable degree of freedom for productive enterprise has brought into practically all the fields of manufacture more plants than can be kept running at full time capacity from year to year. For the greater part of the time there is not a full employment of the equipment and organization of industrial enterprises. Many of these plants have doubtless come to rely on the possibility of avoiding the cutthroat competition which would undermine their stability, through reliance on some form of coöperation or on some device which will shift the competition to a style or brand basis.

The influence of fixed costs on market price can not, therefore, be regarded as a factor causing merely temporary divergences from what has been called normal cost. On the contrary, the presence of fixed costs as a significant fraction of total costs tends to modify for an indefinite period of time the character of competition. If fixed costs are large there must be a style or brand competition on the one hand or, on the other hand, consolidation of producers similar to that which took place in the steel industry, in the railroads, and in various large-plant industries producing goods of a comparatively staple character. The ordinary supposition in regard to cost computation under free competition does not allow for a production of goods below cost when the producers anticipate at the time of initiating production that the output is to be sold below cost. The fact that full time operation of industrial equipment is not the normal condition of industry means that ordinarily a group of freely competing machine industries will sell the output below cost and that some degree of coöperation is necessary to secure a scale of prices that will yield an adequate return on fixed investments.

Any attempt to measure the expediency either of the style and brand type of competition or of government supervision is outside the scope of this paper. Much could be said of the multiplication of advertising costs through style and brand competition. The difficulties and dangers of government supervision need not be dwelt on. It is intended here to point out merely that the cause of the appearance of these problems is to be found in the development of cutthroat competition.

SPURGEON BELL.

UNIVERSITY OF TEXAS.